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| EXAMINER | |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| **Office Action Summary** | **Application No.** 10/505,444 | **Applicant(s)** SIMONIS, HELMUT MATTHIAS |
|---|---|---|
| | **Examiner** SYED BOKHARI | **Art Unit** 2473 |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *29 March 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

## DETAILED ACTION

### *Response to Amendment*

1. Applicant amendment filed on March 29$^{th}$, 2010 has been entered. Claims 1, 17 and 26-28 have been amended. Claims 1-28 are pending in the application.

### *Claim Rejections - 35 USC § 101*

2. Claim 28 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Regarding claim 28, it lacks the proper form for a claim directed to computer/machine readable instructions. To be statutory claims directed to computer/machine readable instructions must be embodied on a computer readable medium encoded with a process or data structure usable by a computer. For the claim to be statutory the preamble of the claim must define a structural and functional interrelationship between the process or data structure and computer software and hardware components. As a result, the preamble of the claim must define a process or data structure as a “non- transitory computer readable medium” embodying the process or data structure. To overcome this rejection, it is suggested to Applicant to insert the phrase "a non-transitory" in front of the computer readable medium.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1, 5, 24 and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over San Filippo III (USP 7,068,630) in view of Blouin et al. (US 2003/0126246 A1) and further in view of Carpini et al. (2003/0043792 A1).

San Filippo, III discloses a communications systems for measuring load between devices for use in determining path with optimal throughput with the following features: regarding claim 1, a method of calculating traffic values in a communication network (Fig. 1, communication system employing load measurement, see “node measure its own load and communicates its load to neighboring nodes” recited in column 1 lines 62-67 and column 2 lines 1-7), the communications network comprising a plurality of nodes the nodes being connected to one another by links the method comprising

(Fig. 1, communication system employing load measurement, see “system having a plurality of nodes connected to each other” recited in column 1 lines 54-62), obtaining at a management system traffic data measurements through the nodes or links in an initial scenario as input data (Fig. 1, communication system employing load measurement, see “monitoring and measuring the load of each of communication links ” recited in column 2 lines 47-60); regarding claim 5, further comprising the step of verifying the consistency of the measured input data (Fig. 1, communication system employing load measurement, see “load measurement is determined with accuracy with synchronized period of load” recited in column 2 lines 61-67 and column 3 lines 1-2) and using information about the network topology or the network behavior of the initial scenario (Fig. 1, communication system employing load measurement, see “the load measurement elements each monitor the traffic on the point to point paths between their associated e-radio, poletop and wireless modem” recited in column 2 lines 23-39); regarding claim 26, an apparatus for calculating traffic values in a communications network (Fig. 1, communication system employing load measurement, see “node measure its own load and communicates its load to neighboring nodes” recited in column 1 lines 62-67 and column 2 lines 1-7), the communications network comprising a plurality of nodes, the nodes being connected to one another by links, the apparatus comprising (Fig. 1, communication system employing load measurement, see “system having a plurality of nodes connected to each other” recited in column 1 lines 54-62), a processor for obtaining traffic data measurements through said nodes or links in an initial scenario as input data (Fig. 1, communication system employing load

measurement, see “monitoring and measuring the load of each of communication links ” recited in column 2 lines 47-60); regarding claim 27, a network management system for managing a network comprising a plurality of nodes (Fig. 1, communication system employing load measurement, see “node measure its own load and communicates its load to neighboring nodes” recited in column 1 lines 62-67 and column 2 lines 1-7), the nodes being interconnected by links, the network management system comprising (Fig. 1, communication system employing load measurement, see “system having a plurality of nodes connected to each other” recited in column 1 lines 54-62), a processor for obtaining data traffic data measurements through said nodes or links in an initial scenario as input data (Fig. 1, communication system employing load measurement, see “monitoring and measuring the load of each of communication links ” recited in column 2 lines 47-60).

San Filippo, III does not disclose the following features: regarding claim 1, deriving at a management system a traffic flow model for a modified scenario using a plurality of constraints describing the interdependency of the initial to the modified scenario and calculating at a management system values or upper and lower bounds of traffic values for the modified scenario from the traffic flow model using the input data; regarding claim 24, further comprising calculating a minimal and a maximal value for each solution variable taking into account one or more of the different modifications; regarding claim 26, deriving a traffic flow model for a modified scenario using a plurality of constraints describing the interdependency of said initial to said modified scenario, calculating values or upper and lower bounds of traffic values for said modified scenario

from said traffic flow model using said input data and memory for storing said traffic data measurements and said traffic flow model; regarding claim 27, considering a modified scenario defining one or more solution variables for said modified scenario, determining constraints between traffic flows through said links and nodes to describe the network topology and behavior of the network, deriving a traffic flow model using said input data and said relations for calculating said solution variables and Memory for storing said data traffic measurements and said traffic flow model.

Blouin et al. disclose a communication system for provisioning resource allocation, routing, network control and network self-governance with the following features: regarding claim 1, deriving at a management system a traffic flow model for a modified scenario using a plurality of constraints describing the interdependency of the initial to the modified scenario (Fig. 1, illustrates a functional representation of multi-stratum multi-timescale network control, see "where the method enables the network to autonomously adapt time-varying traffic" recited in paragraph 0008 lines 1-14) and calculating at a management system values or upper and lower bounds of traffic values for the modified scenario from the traffic flow model using the input data (Fig. 1, illustrates a functional representation of multi-stratum multi-timescale network control, see "where the method enables the network to autonomously adapt time-varying traffic" recited in paragraph 0008 lines 1-14); regarding claim 24, further comprising calculating a minimal and a maximal value for each solution variable taking into account one or more of the different modifications (Fig. 1, illustrates a functional representation of multi-stratum multi-timescale network control, see "where the method enables the

network to autonomously adapt time-varying traffic" recited in paragraph 0008 lines 1-14); regarding claim 26, deriving a traffic flow model for a modified scenario using a plurality of constraints describing the interdependency of said initial to said modified scenario (Fig. 1, illustrates a functional representation of multi-stratum multi-timescale network control, see "where the method enables the network to autonomously adapt time-varying traffic" recited in paragraph 0008 lines 1-14), calculating values or upper and lower bounds of traffic values for said modified scenario from said traffic flow model using said input data (Fig. 1, illustrates a functional representation of multi-stratum multi-timescale network control, see "where the method enables the network to autonomously adapt time-varying traffic" recited in paragraph 0008 lines 1-14); regarding claim 27, considering a modified scenario defining one or more solution variables for said modified scenario, determining constraints between traffic flows through said links and nodes to describe the network topology and behavior of the network (Fig. 1, illustrates a functional representation of multi-stratum multi-timescale network control, see "where the method enables the network to autonomously adapt time-varying traffic" recited in paragraph 0008 lines 1-14), deriving a traffic flow model using said input data and said relations for calculating said solution variables (Fig. 1, illustrates a functional representation of multi-stratum multi-timescale network control, see "where the method enables the network to autonomously adapt time-varying traffic" recited in paragraph 0008 lines 1-14).

It would have been obvious to one of the ordinary skill in the art at the time of invention to modify the system of San Filippo, III by using the features, as taught by

Blouin et al., in order to provide deriving at a management system a traffic flow model for a modified scenario using a plurality of constraints describing the interdependency of the initial to the modified scenario and calculating at a management system values or upper and lower bounds of traffic values for the modified scenario from the traffic flow model using the input data. The motivation of using these functionalities is to enhance the system in a cost effective manner.

San Filippo, III and Blouin et al. do not fully disclose the following features: regarding claim 26, memory for storing said traffic data measurements and said traffic flow model; regarding claim 27, Memory for storing said data traffic measurements and said traffic flow model.

Carpini et al. disclose a label switched communication network for controlling the flow of data over a communication network with the following features: regarding claim 26, memory for storing said traffic data measurements and said traffic flow model (Fig. 1A, shows a communication network in accordance with an embodiment of the present invention in a first mode of operation, see “the label identifying each data flow is used by the second switching router to determine the next operation to be applied to data packets tagged with that label. A copy of each data flow label is stored in memory at the second switching router with a corresponding instruction” recited in paragraph 0039 lines 1-19); regarding claim 27, Memory for storing said data traffic measurements and said traffic flow model (Fig. 1A, shows a communication network in accordance with an embodiment of the present invention in a first mode of operation, see “the label identifying each data flow is used by the second switching router to determine the next

operation to be applied to data packets tagged with that label. A copy of each data flow label is stored in memory at the second switching router with a corresponding instruction" recited in paragraph 0039 lines 1-19).

It would have been obvious to one of the ordinary skill in the art at the time of invention to modify the system of San Filippo, III with Blouin et al. by using the features, as taught by Carpini et al., in order to provide memory for storing said traffic data measurements and said traffic flow model. The motivation of using these functions is that it discloses a label switched communication network for controlling the flow of data over a communication network.

6. Claims 6-7, 9, 11-12 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over San Filippo III (USP 7,068,630) in view of Blouin et al. (US 2003/0126246 A1) and Carpini et al. (2003/0043792 A1) as applied to claim 1 and 6 above, and further in view of Saito (US 6,404,744 B1).

San Filippo, III, Blouin et al. and Carpini et al. disclose the claimed limitations as described in paragraph 5 above. San Filippo, III, Blouin et al. and Carpini et al. do not disclose the following features: regarding claim 6, wherein the input data are corrected if inconsistencies are detected; regarding claim 7, further comprising solving a linear programming problem with a linear objective function to minimize the data traffic reconciliation (error correction); regarding claim 9, wherein in step (b) the traffic values in the modified scenario are expressed as a linear function of node-to-node flows in the

initial scenario; regarding claim 11, wherein the traffic values comprise utilization, overload or traffic volume values and regarding claim 12, wherein the constraints comprise linear constraints; regarding claim 19, wherein the solution variables can be expressed as a linear function of one or more node-to-node flows of the network.

Saito discloses communication network design techniques to cope with demand variations and network fault with the following features: regarding claim 6, wherein the input data are corrected if inconsistencies are detected (Fig. 2, a block diagram showing the configuration of a communication network design system, see "the input data is supplied to produce optimized network design" recited in column 4 lines 23-38); regarding claim 7, further comprising solving a linear programming problem with a linear objective function to minimize the data traffic reconciliation (error correction) (Fig. 1, a block diagram showing the configuration of a conventional communication network, see "solves a linear programming problem with maximizing or minimizing an objective function" recited in column 1 lines 39-50 in background of the invention); regarding claim 9, wherein in step (b) the traffic values in the modified scenario are expressed as a linear function of node-to-node flows in the initial scenario; regarding claim 11, wherein the traffic values comprise utilization, overload or traffic volume values (Fig. 2, a block diagram showing the configuration of a communication network design system, see "solving this linear programming is obtained by the transformation processing" recited in column 6 lines 11-21) and regarding claim 12, wherein the constraints comprise linear constraints (Fig. 1, a block diagram showing the configuration of a conventional communication network, see "represented by a linear equation under the

constraint condition represented with some linear equalities or inequalities" recited in column 1 lines 47-50); regarding claim 19, wherein the solution variables can be expressed as a linear function of one or more node-to-node flows of the network (Fig. 3, operation 300 of output controller 110, see "maintain a congestion model comprising plurality of congestion dependencies and relieve congestion by increasing output resources and decreasing traffic rates" recited in column 1 line 67 and column 2 lines 1-16);

It would have been obvious to one of the ordinary skill in the art at the time of invention to modify the system of San Filippo, III with Blouin et al. and Carpini et al. by using the features, as taught by Saito et al., in order to provide the input data are corrected if inconsistencies are detected solving a linear programming problem with a linear objective function to minimize the data traffic reconciliation (error correction), the traffic values in the modified scenario are expressed as a linear function of node-to-node flows in the initial scenario, the traffic values comprise utilization, overload or traffic volume values, the constraints comprise linear constraints and the solution variables can be expressed as a linear function of one or more node-to-node flows of the network. The motivation of using these functionalities is to enhance the system in a cost effective manner.

7. Claims 3, 17 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over San Filippo III (USP 7,068,630) in view of Blouin et al. (US 2003/0126246 A1) and

Carpini et al. (2003/0043792 A1) as applied to claim 1 above, and further in view of Aukia et al. (USP 6,594,268 B1).

San Filippo, III, Blouin et al. and Carpini et al. disclose the claimed limitations as described in paragraph 5 above. San Filippo III discloses the following features: and regarding claim 17, a method of calculating traffic values in a communications network (Fig. 1, communication system employing load measurement, see “node measure its own load and communicates its load to neighboring nodes” recited in column 1 lines 62-67 and column 2 lines 1-7), the communications networking comprising a plurality of nodes the nodes being connected to one another by links, the method comprising (Fig. 1, communication system employing load measurement, see “system having a plurality of nodes connected to each other” recited in column 1 lines 54-62), obtaining at a management system data traffic data measurements through the nodes or links in an initial scenario as input data (Fig. 1, communication system employing load measurement, see “monitoring and measuring the load of each of communication links ” recited in column 2 lines 47-60) and regarding claim 28, calculating traffic values in the communication network, the communication network (Fig. 1, communication system employing load measurement, see “node measure its own load and communicates its load to neighboring nodes” recited in column 1 lines 62-67 and column 2 lines 1-7), comprising a plurality of nodes connected to one another by links comprising (Fig. 1, communication system employing load measurement, see “system having a plurality of nodes connected to each other” recited in column 1 lines 54-62) and code for obtaining

data traffic data measurements through the nodes or links in an initial scenario as input data (Fig. 1, communication system employing load measurement, see “monitoring and measuring the load of each of communication links ” recited in column 2 lines 47-60).

Blouin et al. disclose the following features: regarding claim 17, deriving at a management system a traffic flow model using the input data and the relations for calculating the solution variables (Fig. 1, illustrates a functional representation of multi-stratum multi-timescale network control, see "where the method enables the network to autonomously adapt time-varying traffic" recited in paragraph 0008 lines 1-14); regarding claim 28, code for deriving a traffic flow model using the input data and the relations for calculating the solution variables (Fig. 1, illustrates a functional representation of multi-stratum multi-timescale network control, see "where the method enables the network to autonomously adapt time-varying traffic" recited in paragraph 0008 lines 1-14) and code for calculating values or upper and lower bounds of traffic values for the modified scenario from the traffic flow model using the input data (Fig. 1, illustrates a functional representation of multi-stratum multi-timescale network control, see "where the method enables the network to autonomously adapt time-varying traffic" recited in paragraph 0008 lines 1-14).

San Filippo III, Blouin et al. and Carpini et al. do not disclose the following features: claim 3, wherein the constraints are derived from the network topology and network behavior of the initial network; regarding claim 17, defining one or more solution variables for the modified scenario and determining constraints between traffic flows through the links and nodes to describe the network topology and behavior of the

network and regarding claim 28, a computer readable medium encoded with a computer program.

Aukia et al. disclose a communication system for adaptive routing system and method for QoS with the following features: regarding claim 3, wherein the constraints are derived from the network topology and network behavior of the initial network (Fig. 10, shows an flowchart for a router implementing adaptive routing when a trigger event is detected, see "initial values are provided to define the network topology and network characteristics" recited in column 21 lines 25-38); regarding claim 17, defining one or more solution variables for the modified scenario (Fig. 5, a block diagram of a distributed processing and database system, see "the routing module 506 may require additional network topology information than that currently collected" recited in column 14 lines 45-52) and determining at a management system constraints between traffic flows through the links and nodes to describe the network topology and behavior of the network (Fig. 10, shows an flowchart for a router implementing adaptive routing when a trigger event is detected, see "initial values are provided to define the network topology and network characteristics" recited in column 21 lines 25-38) and regarding claim 28, a computer readable medium encoded with a computer program (Fig. 10, shows an flowchart for a router implementing adaptive routing when a trigger event is detected, see "functions may also be implemented as processing steps in a software program of a general purpose computer" recited in column 26 lines 58-65).

It would have been obvious to one of the ordinary skill in the art at the time of invention to modify the system of San Filippo III with Blouin et al. and Carpini et al. by

using the features, as taught by Aukia et al., in order to provide defining one or more solution variables for the modified scenario and determining at a management system constraints between traffic flows through the links and nodes to describe the network topology and behavior of the network, the constraints are derived from the network topology and network behavior of the initial network, defining one or more solution variables for the modified scenario and determining constraints between traffic flows through the links and nodes to describe the network topology and behavior of the network and a computer readable medium encoded with a computer program. The motivation using these functionalities is to enhance the system in a cost effective manner.

8. Claims 4, 18, 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over San Filippo III (USP 7,068,630) in view of Blouin et al. (US 2003/0126246 A1), Carpini et al. (2003/0043792 A1) and Aukia et al. (USP 6,594,268 B1) as applied to claims 1 and 17 above, and further in view of Basturk (USP 7,111,074 B2).

San Filippo III, Blouin et al., Carpini et al. and Aukia et al. describe the claimed limitations as discussed in paragraphs 5 and 7 above. San Filippo III, Blouin et al., Carpini et al. and Aukia et al. do not disclose the following features: regarding claim 4, wherein step (b) further comprises performing a routing procedure in the modified scenario; regarding claim 18, wherein further comprises performing a routing process for the modified scenario; regarding claim 21, wherein the constraints comprising any of

the following constraints: routing-based constraints link-based constraints node-based constraints error-based constraints and regarding claim 22, wherein the constraints relate to any of the following the size of data packets used in the network; relationship between the number of data packets and the data traffic volume; constraints determined by the routing protocol used in the network; the relationship between incoming and outgoing data traffic at the plurality of nodes; the relationship between the data traffic at both ends of each link; the relationship between the data traffic along the routes and the data traffic input into and output from the network.

Basturk discloses communication system for controlled data path load balancing on a data packet network with the following features: regarding claim 4, wherein step (b) further comprises performing a routing procedure in the modified scenario (Fig. 1, route computing sequence, see "each router broadcasts the state of every router's adjacent link to every other router in the network topology" recited in column 1 lines 19-29 in background of the invention); regarding claim 18, wherein further comprises performing a routing process for the modified scenario (Fig. 1, route computing sequence, see "each router broadcasts the state of every router's adjacent link to every other router in the network topology" recited in column 1 lines 19-29 in background of the invention); regarding claim 21, wherein the constraints comprising any of the following constraints: routing-based constraints link-based constraints node-based constraints error-based constraints (Fig.2, route computing sequence using label affecting data route determination, see "link costs to be incurred per data link between the nodes" recited in column 2 lines 47-55) and regarding claim 22, wherein the constraints relate to any of

the following the size of data packets used in the network; relationship between the number of data packets and the data traffic volume; constraints determined by the routing protocol used in the network; the relationship between incoming and outgoing data traffic at the plurality of nodes; the relationship between the data traffic at both ends of each link; the relationship between the data traffic along the routes and the data traffic input into and output from the network

It would have been obvious to one of the ordinary skill in the art at the time of invention to modify the system of San Filippo III with Blouin et al., Carpini et al. and Aukia et al. by using the features, as taught by Basturk, in order to provide further performing a routing procedure, the constraints comprising any of routing-based constraints link-based constraints node-based constraints error-based constraints, the constraints relate to any of the following the size of data packets used in the network; relationship between the number of data packets and the data traffic volume, constraints determined by the routing protocol used in the network; the relationship between incoming and outgoing data traffic at the plurality of nodes the relationship between the data traffic at both ends of each link and the relationship between the data traffic along the routes and the data traffic input into and output from the network. The motivation using the network management system capabilities is to enhance the system in a cost effective manner.

9. Claims 13-14 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over San Filippo III (USP 7,068,630) in view of Blouin et al. (US 2003/0126246 A1),

Carpini et al. (2003/0043792 A1) and Aukia et al. (USP 6,594,268 B1) as applied to claims 1 and 17 above, and further in view of Baumann et al. (US 7,047,309 B2).

San Filippo III, Blouin et al., Carpini et al. and Aukia et al. describe the claimed limitations as discussed in paragraphs 5 and 7 above. San Filippo III, Blouin et al., Carpini et al.. and Aukia et al. do not disclose the following features: regarding claim 13, wherein the constraints comprise non-linear constraints; regarding claim 14, wherein a linear approximation to a non-linear constraint is used; regarding claim 20, wherein the constraints in step (b) include relations among data traffic rates based on the definition of network protocol (such as IP, TCP, UDP) which defines the network behavior.

Baumann et al. discloses communication system for load balancing and dynamic control of multiple data streams with the following features: regarding claim 13, wherein the constraints comprise non-linear constraints (Fig. 1, data processing system network, see "non-linear constrains on the network include data distribution like text, code, images, video, audio mix and differences in equipment performance and user skill to operate" recited in column 1 lines 22-44 in background of the invention); regarding claim 14, wherein a linear approximation to a non-linear constraint is used (Fig. 1, data processing system network, see "performance is tracked and number and data stream dynamically modified as conditions in the network infrastructure" recited in column 3 lines 4-16); regarding claim 20, wherein the constraints in step (b) include relations among data traffic rates based on the definition of network protocol (such as IP, TCP, UDP) which defines the network behavior (Fig. 3, a system performing large data

transfer over the Internet, see “available bandwidth utilization during transfer of large data stream over a TCP/IP network” recited in column 3 lines 4-5 and column 1 lines 31-34).

It would have been obvious to one of the ordinary skill in the art at the time of invention to modify the system of San Filippo III with Blouin et al., Carpini et al. and Aukia et al. by using the features, as taught by Baumann et al., in order to provide the constraints comprise non-linear constraints, a linear approximation to a non-linear constraint is used and the constraints include relations among data traffic rates based on the definition of network protocol (such as IP, TCP, UDP) which defines the network behavior. The motivation using the network management system capabilities is to enhance the system in a cost effective manner.

10. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over San San Filippo III (USP 7,068,630) in view of Blouin et al. (US 2003/0126246 A1) and Carpini et al. (2003/0043792 A1) as applied to claim 1 above, and further in view of Takase et al. (USP 5,042,027).

San Filippo III, Blouin et al. and Carpini et al. disclose the claimed limitations as described in paragraph 7 above, San Filippo III, Blouin et al. and Carpini et al. do not disclose the following features: regarding claim 16, further comprising repeating step (a) at different times or at periodic intervals.

Takase et al. discloses a communication system for controlling the load on the network with the following features: regarding claim 16, further comprising repeating step (a) at different times or at periodic intervals (Fig.1, communication node, call controller and network controller, see "the measurements are continuously made a constant period of time" recited in column 5 lines 35-44).

It would have been obvious to one of the ordinary skill in the art at the time of invention to modify the system of San Filippo III with Blouin et al. and Carpini et al. by using the features, as taught by Takase et al., in order to provide repeating step (a) at different times or at periodic intervals. The motivation using the network management system capabilities is to enhance the system in a cost effective manner.

11. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over San Filippo III (USP 7,068,630) in view of Blouin et al. (US 2003/0126246 A1) and Carpini et al. (2003/0043792 A1) as applied to claim 1 above, and further in view of Lee et al. (US 2003/0118027 A1).

San Filippo III, Blouin et al. and Carpini et al. disclose the claimed limitations as described in paragraph 5 above. San Filippo III, Blouin et al. and Carpini et al. do not disclose the following features: regarding claim 2, wherein the modified scenario comprises one or more of: a modified network topology, modified routing algorithm parameters, modified traffic engineering constraints or modified traffic load compared to the initial scenario.

Lee et al. disclose a communication system for identifying routes through a network with the following features: regarding claim 2, wherein the modified scenario comprises one or more of: a modified network topology, modified routing algorithm parameters, modified traffic engineering constraints or modified traffic load compared to the initial scenario (Fig. 2, block diagram of the routing system, see "produces a modified network topology 34" recited in paragraph 0039 lines 1-8).

It would have been obvious to one of the ordinary skill in the art at the time of invention to modify the system of San Filippo III with Blouin et al. and Carpini et al. by using the features, as taught by Lee et al., in order to provide the modified scenario comprises one or more of: a modified network topology, modified routing algorithm parameters, modified traffic engineering constraints or modified traffic load compared to the initial scenario. The motivation using the network management system capabilities is to enhance the system in a cost effective manner.

12. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over San Filippo III (USP 7,068,630) in view of Blouin et al. (US 2003/0126246 A1), Carpini et al. (2003/0043792 A1) and Saito (US 6,404,744 B1) as applied to claims 1 and 6 above, and further in view of Thang et al. (US 2002/0167898 A1).

San Filippo III, Blouin et al., Carpini et al. and Saito disclose the claimed limitations as described in paragraphs 4 and 5 above. San Filippo III, Blouin et al., Carpini et al. and Saito do not disclose the following features: regarding claim 8, further

comprising solving a linear programming problem with a non-linear objective function to minimize the data traffic reconciliation (error correction).

Thang et al. disclose a communication system for restoring the network by using precalculated and stored restoration routing table with the following features: regarding claim 8, further comprising solving a linear programming problem with a non-linear objective function to minimize the data traffic reconciliation (error correction) (Fig. 3, shows a six node network connected in various configurations, see "the non-linear constraint 15 is to a set of linear constraints" recited in paragraph 0142 lines 1-4).

It would have been obvious to one of the ordinary skill in the art at the time of invention to modify the system of San Filippo III with Blouin et al., Carpini et al. and Saito by using the features, as taught by Thang et al., in order to provide solving a linear programming problem with a non-linear objective function to minimize the data traffic reconciliation. The motivation using the network management system capabilities is to enhance the system in a cost effective manner.

13. Claims 10, 15, 23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over San Filippo III (USP 7,068,630) in view of Blouin et al. (US 2003/0126246 A1) and Carpini et al. (2003/0043792 A1) as applied to claim 1 above, and further in view of Cwilich et al. (US 7,302,482 B2) and Petersons et al. (WO 96/19905).

San Filippo III, Blouin et al. and Carpini et al. disclose the claimed limitations as described in paragraph 5 above. San Filippo III, Blouin et al. and Carpini et al. do not disclose the following features: regarding claim 10, wherein traffic values which are not affected by the modification from the initial to the modified scenario are equal to the corresponding input data or corrected input data of the initial scenario; regarding claim 15, further comprising: selecting a first and a second node; solving a first linear programming problem by computing the upper bound of traffic flow values from the first to the second node; and solving a second linear programming problem by computing the lower bound of traffic flow values from the first to the second set of nodes; regarding claim 23, further comprising repeating stages (b), (c) and (d) for different modifications of the network and regarding claim 25, further comprising calculating one consistent solution for all solution variables taking into account all the modifications.

Cwilich et al. disclose a communication system for optimizing network restoration and, more particularly, to optimizing restoration capacity and/or restoration paths for a network to resolve a restoration scenario or problem through the use of linear programming with the following features: regarding claim 15, further comprising: selecting a first and a second node; solving a first linear programming problem by computing the upper bound of traffic flow values from the first to the second node (Fig. 18, a flowchart illustrating an exemplary process by which restoration paths are generated between each LP iteration of the column generation process of FIG. 15 according to a modified Dijkstra's shortest path algorithm" The dynamic path control policy regulates the number of restoration paths retained for use in each LP iteration. In

particular, an upper bound S is set and represents the maximum number of restoration paths" recited in column 20 lines 55-61) and solving a second linear programming problem by computing the lower bound of traffic flow values from the first to the second set of nodes (Fig. 18, a flowchart illustrating an exemplary process by which restoration paths are generated between each LP iteration of the column generation process of FIG. 15 according to a modified Dijkstra's shortest path algorithm" The dynamic path control policy regulates the number of restoration paths retained for use in each LP iteration. In particular, an upper bound S is set and represents the maximum number of restoration paths" recited in column 20 lines 61-67) and regarding claim 25, further comprising calculating one consistent solution for all solution variables taking into account all the modifications (Fig. 2, is a schematic block diagram illustrating a system configured to utilize a path-based method to compute an optimal restoration capacity and/or optimal restoration paths for a network to resolve a restoration scenario or problem through the use of linear programming (LP) in accordance with a first embodiment of the invention, see "computing an optimal restoration capacity and/or optimal restoration path for a network to resolve a restoration scenario or problem ("hereinafter restoration scenario") by solving a linear program (LP) model, wherein the linear program model includes decision variables corresponding to restoration capacity and restoration paths and constraints requiring restoration of traffic and conservation of capacity in the network" recited in column 1 lines 48-65).

It would have been obvious to one of the ordinary skill in the art at the time of invention to modify the system of San Filippo III with Blouin et al. and Carpini et al. by

using the features, as taught by Cwilich et al., in order to provide solving a linear programming problem with a non-linear objective function to minimize the data traffic reconciliation. The motivation using the network management system capabilities is to enhance the system in a cost effective manner.

San Filippo III, Blouin et al., Carpini et al. and Cwilich et al. do not disclose the following features: regarding claim 10, wherein traffic values which are not affected by the modification from the initial to the modified scenario are equal to the corresponding input data or corrected input data of the initial scenario; regarding claim 23, further comprising repeating stages (b), (c) and (d) for different modifications of the network.

Petersons disclose a cellular communication system for accommodating traffic demand with the following features: regarding claim 10, wherein traffic values which are not affected by the modification from the initial to the modified scenario are equal to the corresponding input data or corrected input data of the initial scenario (Fig. 2, illustrating a configuration of a gateway and a system control segment, see “the input traffic data to SCS 52 from GWs 50 over link 54for creating a subscriber prediction” recited in lines 29-37 page 5 and line 1 page 6); regarding claim 23, further comprising repeating stages (b), (c) and (d) for different modifications of the network (Fig. 6, illustrates a flow chart of a method of comparing the communication system based on a traffic prediction, see "transmits the calculated channel allocations (step 108) by evaluating call data records (CDR) recited in lines 29-36 page 7 and lines 11-14 page 12-16).

It would have been obvious to one of the ordinary skill in the art at the time of invention to modify the system of San Filippo III with Blouin et al., Carpini et al. and

Cwilich et al. by using the features, as taught by Petersons et al., in order to provide traffic values which are not affected by the modification from the initial to the modified scenario are equal to the corresponding input data or corrected input data of the initial scenario and repeating stages for different modifications of the network. The motivation using the network management system capabilities is to enhance the system in a cost effective manner. Applicant states "there is no teaching of correcting input data if inconsistencies are detected. With regard to claims 7 and 9, the Examiner refers to the Background in Saito, which merely describes an optimization section that solves a linear programming problem generated by an optimization reference generator to determine the capacities of the paths and links. There is no teaching of solving a linear programming problem with a linear objective function to minimize data traffic reconciliation (error correction), as set forth in claim 7, or traffic values in a modified scenario expressed as a linear function of node-to-node flows in an initial scenario, as set forth in claim 9". Examiner respectfully disagrees. Saito teaches the claimed limitations "

***Response to Arguments***

Applicant's arguments filed March 29th, 2010 have been fully considered but they are not persuasive. Applicant states in the remarks regarding claim 1, "Blouin et al. do not derive a traffic flow model for a modified scenario using a plurality of constraints describing the interdependency of an initial to a modified scenario or calculate values or upper and lower bounds of traffic values for a modified scenario from a traffic model

using input data. In contrast to the claimed invention, Blouin et al. simply perform resource allocation, network provisioning and routing on different timescales". Examiner respectfully disagrees. Blouin teaches the claimed limitations "deriving a traffic flow model for a modified scenario using a plurality of constraints describing the interdependency of the initial to the modified scenario". The prior art teaches the present invention advantageously provides a multi-stratum multi-timescale control system and method for a network of nodes connected with links, where the method enables the network to autonomously adapt to time-varying traffic and network state. The steps in the method are based on multi-timescale measurements in the network to offer real-time resource allocation and provide long-term provisioning requirements. Network functions for each stratum rely upon the effective operation of network functions of lower strata, with each stratum operating at a different timescale. The network is enabled to autonomously adapt to time-varying traffic and network-state by receiving real-time resource allocation and long-term provisioning requirements according to the present invention (paragraph 0008). Blouin clearly states that the method enables the network to autonomously adapt to time-varying traffic and network state and the method are based on multi-timescale measurements in the network to offer real-time resource allocation. The method allows the network to correct resource allocations based on requirements reported by the resource allocation function. The control is implemented in the network through coordination across edge node controllers, core node controllers, and network controllers. Metrics based on automated measurements of network performance are used by the control to adjust network

resources. Applicant states in the remarks “In Response to the Arguments, the Examiner again refers to paragraph [0008], lines 1-14 of Blouin et al. As discussed above, this section of the patent application describes how a source node chooses the best available route from a sorted list of routes and collects information of the state of these routes. The Examiner has not cited any teaching of deriving a traffic flow model for a modified scenario or calculating upper and lower bounds of traffic values for the modified scenario from a traffic flow model using input data”. Examiner respectfully disagrees. Examiner respect fully disagrees. Blouin teaches the claimed limitations “calculating values or upper and lower bounds of traffic values for the modified scenario from the traffic flow model using the input data”. The prior art teaches that this invention describes a control in which the network functions of each stratum collaborate to achieve self-governance. A function from a lower stratum, if any, collects performance metrics, which are used to calculate resource requirements sent to an upper stratum. A routing index and a resource allocation index are advantageously provided by the present invention. The routing index may be based on measurements relating to route depth, constituent traffic, or traffic classification with respect to defined thresholds. A provisioning method described as another aspect of this invention calculates capacity requirements based on constituent traffic, and avoids the duplicate counting of traffic demands (paragraph 0009). Blouin clearly teaches that the network is enabled to autonomously adapt to time-varying traffic and network-state by receiving real-time resource allocation and a function from a lower stratum collects performance metrics, which are used to calculate resource requirements sent to an upper stratum. Applicant

states in the remarks "Furthermore, Blouin et al. do not teach using constraints to describe the interdependency of an initial to a modified scenario”. Examiner respectfully disagrees. Blouint teaches that the method enables the network to autonomously adapt to time-varying traffic and network state. Network functions for each stratum rely upon the effective operation of network functions of lower strata, with each stratum operating at a different timescale. The lower strata of the self-governing network collect performance measurements, including routing index, resource allocation index, and constituent traffic, and identify overloaded links that are candidates for resource augmentation. They provide a list of these candidate links to the provisioning function. The provisioning function then formulates link-provisioning requirements, by selecting the candidate links that should be augmented and calculating their desired capacity. Applicant states in the remarks “claim 5 is further submitted as patentable over San Filippo, which does not show or suggest verifying the consistency of measured input data using information about the network topology or behavior of the initial scenario”. Examiner respectfully disagrees. San Filippo teaches the claimed limitations “further comprising the step of verifying the consistency of the measured input data using information about the network topology or the network behavior of the initial scenario” as recited in column 2 lines 23-39, 61-67 and column 3 lines 1-2. The prior art teaches that the period of load measurement of the communication link is synchronized to the period or epoch of load measurement of the locally-originated traffic. Thus, it can be determined with accuracy what the relative contribution of each load is to the net load. Locally-generated heartbeats of known rate and pattern are employed to send the load

information via the communication link, so that load measurements remain synchronized even when the measurements are not simultaneous. These load measurements are broadcast to all neighbors sharing the heartbeat. Applicant states in the remarks "with regard to claim 24, Blouin et al. do not teach calculating a minimal and a maximal value for each solution variable taking into account one or more different Modifications". Examiner respectfully disagrees. Blouin teaches that this invention describes a control in which the network functions of each stratum collaborate to achieve self-governance. Blouin clearly teaches that the network is enabled to autonomously adapt to time-varying traffic and network-state by receiving real-time resource allocation and a function from a lower stratum collects performance metrics, which are used to calculate resource requirements sent to an upper stratum.

### *Conclusion*

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SYED BOKHARI whose telephone number is (571)270-3115. The examiner can normally be reached on Monday through Friday 8:00-17:00 Hrs..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kwang B. Yao can be reached on (571) 272-3182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Syed Bokhari/
Examiner, Art Unit 2473
6/30/2010

/Steven HD Nguyen/
Primary Examiner, Art Unit 2473